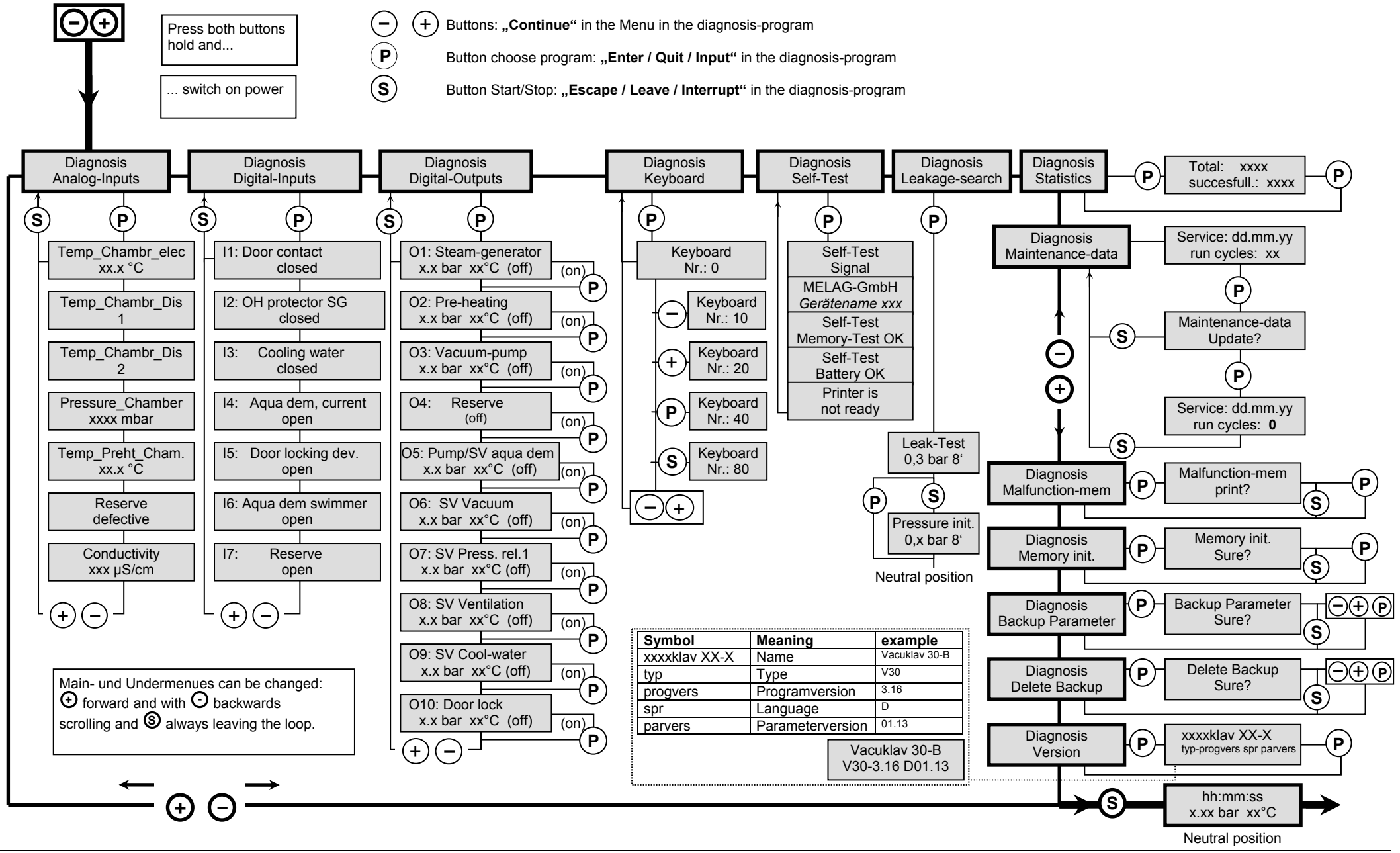
Euroklav®23-S
Euroklav®29-S

MELAG

Program-cycle / Diagnosis-program

Vacuklav®: 24-B / 30-B / 31-B
Euroklav®: 23-S / 23V-S / 29-S / 29V-S


Press both buttons hold and...
... switch on power
(−) (+) Buttons: „Continue“ in the Menu in the diagnosis-program
(P) Button choose program: „Enter / Quit / Input“ in the diagnosis-program
(S) Button Start/Stop: „Escape / Leave / Interrupt“ in the diagnosis-program
Diagnosis Analog-Inputs
Temp_Chambr_elec xx.x °C
Temp_Chambr_Dis 1
Temp_Chambr_Dis 2
Pressure_Chamber xxxx mbar
Temp_Preht_Cham. xx.x °C
Reserve defective
Conductivity xxx µS/cm
Diagnosis Digital-Inputs
I1: Door contact closed
I2: OH protector SG closed
I3: Cooling water closed
I4: Aqua dem, current open
I5: Door locking dev. open
I6: Aqua dem swimmer open
I7: Reserve open
Diagnosis Digital-Outputs
O1: Steam-generator x.x bar xx°C (off)
O2: Pre-heating x.x bar xx°C (off)
O3: Vacuum-pump x.x bar xx°C (off)
O4: Reserve (off)
O5: Pump/SV aqua dem x.x bar xx°C (off)
O6: SV Vacuum x.x bar xx°C (off)
O7: SV Press. rel.1 x.x bar xx°C (off)
O8: SV Ventilation x.x bar xx°C (off)
O9: SV Cool-water x.x bar xx°C (off)
O10: Door lock x.x bar xx°C (off)
(on)
Diagnosis Keyboard
Keyboard Nr.: 0
Keyboard Nr.: 10
Keyboard Nr.: 20
Keyboard Nr.: 40
Keyboard Nr.: 80
Diagnosis Self-Test
Self-Test Signal
MELAG-GmbH Gerätename xxx
Self-Test Memory-Test OK
Self-Test Battery OK
Printer is not ready
Diagnosis Leakage-search
Leak-Test 0,3 bar 8‘
Pressure init. 0,x bar 8‘
Neutral position
Diagnosis Statistics
Total: xxxx succesfull.: xxxx
Diagnosis Maintenance-data
Service: dd.mm.yy run cycles: xx
Maintenance-data Update?
Service: dd.mm.yy run cycles: 0
Diagnosis Malfunction-mem
Malfunction-mem print?
Diagnosis Memory init.
Memory init. Sure?
Diagnosis Backup Parameter
Backup Parameter Sure?
Diagnosis Delete Backup
Delete Backup Sure?
Diagnosis Version
xxxxklav XX-X typ-progvers spr parvers
hh:mm:ss x.xx bar xx°C
Neutral position
Main- und Undermenues can be changed:
(+) forward and with (-) backwards scrolling and (S) always leaving the loop.

Symbol	Meaning	example
xxxxklav XX-X	Name	Vacuklav 30-B
typ	Type	V30
progvers	Programversion	3.16
spr	Language	D
parvers	Parameterversion	01.13

Vacuklav 30-B
V30-3.16 D01.13

FAULT 4: Pressure release

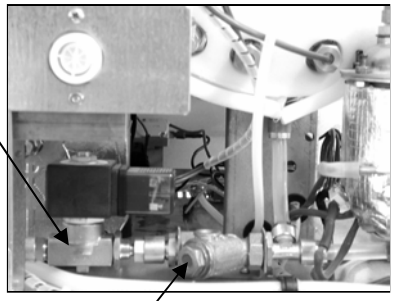
Triggered by : The monitoring time limit Uet5 for the pressure release until reaching P11 has been exceeded.

Causes/ Remedy

Operating fault /Check by personnel:

- Check that the cooling water outlet pipe is free of kinks and has a steady downward gradient
- Check that the water outflow plumbing in the room is not blocked

Appliance fault / Repair by technical service personnel



► Pressure release solenoid valve does not open

- Electrical control system is faulty

⇨ - in the "Diagnosis Program“, switch on output ACOUT 7: the LED for this output lights up
- Measure voltage at ACOUT 7 of control (approx.230V AC)
- Measure voltage at output of the rectifier socket (approx. 200V DC)
- Check coil of solenoid valve is conducting

- Solenoid valve mechanically blocked (clogging)

⇨ Open valve casing

► Pressure release filter clogged

⇨ Remove stopper. Check filter sieve for clogging, clean/exchange, insert new seal and screw tight.

► Pressure sensor / Analog input AIN 3 measures too high

Even after pressure release, pressure signal still shows > P11. Follow-on faults would usually be "Fault 1 Vacuum system", " Fault 34: Sterilization TU"

⇨ Check the pressure displayed in "Diagnosis Program“/ "Analog inputs“ for plausibility, displayed value must correspond to current atmospheric pressure (door open)

⇨ See also under "Fault 34 Sterilization TU“, "Pressure sensor, Analog input AIN 3 measures too high"

Exchange pressure sensor
If fault occurs again exchange CPU-board

FAULT 8: TIME BASE

Triggered by:
Maximum difference between the program duration and the internal timer has been exceeded

Causes/ Remedy

Operating fault/Check by personnel:

Appliance fault / Repair by technical service personnel

► **Internal hardware fault**
- if fault occurs repeatedly, exchange CPU-board

FAULT 9: DOOR OPEN

Triggered by: Door contact (digital input DIN1) was closed during a program

Causes/ Remedy

Operating fault/ Checks by personnel:

- Press down door handle as far as possible

Appliance fault / Repair by technical service personnel

► **Door switch faulty**

- Door switch faulty / needs readjustment
- Electrical connection to CPU-board interrupted
- Digital input DIN1 on CPU-board faulty

⇨ Check in the MELAG- Diagnosis-Program, "Digital Inputs: E 1“ it the door switch needs adjusting, see below.

Adjusting the door contact switch

- In the diagnosis program "Digital Inputs“ select "Input E1: Door contact“
- Insert 8 mm spacer (M8 bolt or similar) between lock housing and upper door beam as shown
- Close door and push down door lock until contact is made
- Loosen right fixing screw of door contact switch
- Turn door contact switch around the left fixing screw until door contact switch engages (Display shows "closed", switching sound)
- Tighten right adjusting screw in new position

FAULT 12 : Door locking

Triggered by:

- The door locking contact DIN5 is not switched after time period z31 (Door closed when no power supply, contact DIN5 still open).

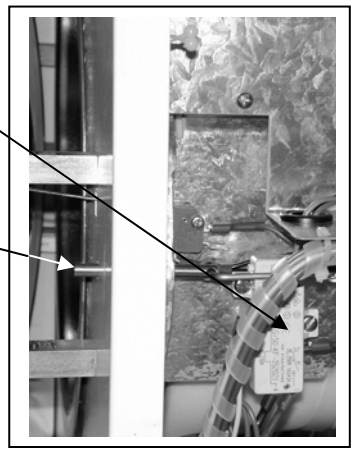
Causes / Remedy:

Operating fault / Check by operating personnel :

- Locking bolt sticking or out of alignment

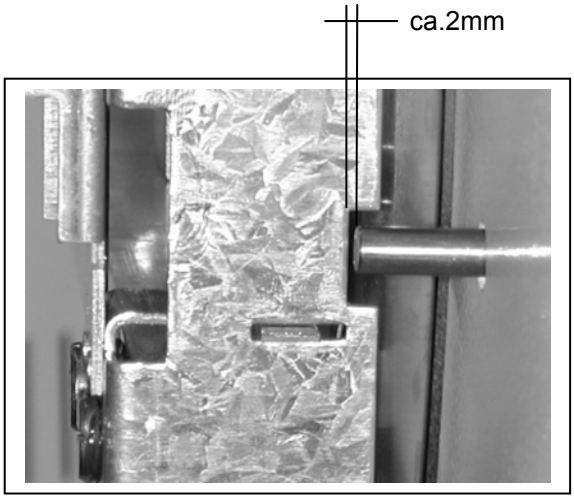
Appliance fault / repair by technical service personnel:

- Control for door locking output ACOUT 10 on CPU-board is faulty (permanent voltage)
- Contact switch on door lock is faulty
- Locking bolt cannot move freely / is blocked



Adjusting the door lock

- Dismantle door cladding, close door
- Loosen fixing screws on the door lock
- By shifting the door lock centralise the face of the locking bolt in the depression as shown, with a spacing of approx. 2 mm
- Tighten fixing screws on the door lock



Door lock will not disengage

The Display permanently shows "Please wait - Door unlocking" after switching power on or after a program has ended (no explicit malfunction reported):

- Control "Door locking" Output ACOUT 10 on CPU-board is faulty
- Drive for the door locking is faulty
- Door contact switch of the door lock is faulty
- Locking bolt cannot move freely / is blocked

⇨ In the MELAG Diagnosis Program switch on output ACOUT10, functional control power output and locking Unlock door manually (for example with the help of a screwdriver).

FAULT18 : Sensor "nr" Input "nr"

Triggered by:

- The internal check of the sensors for temperature, pressure, or conductivity showed too large deviations. Such malfunction reports can occur immediately when the appliance is switched on or while a program is running.

Causes / Remedy

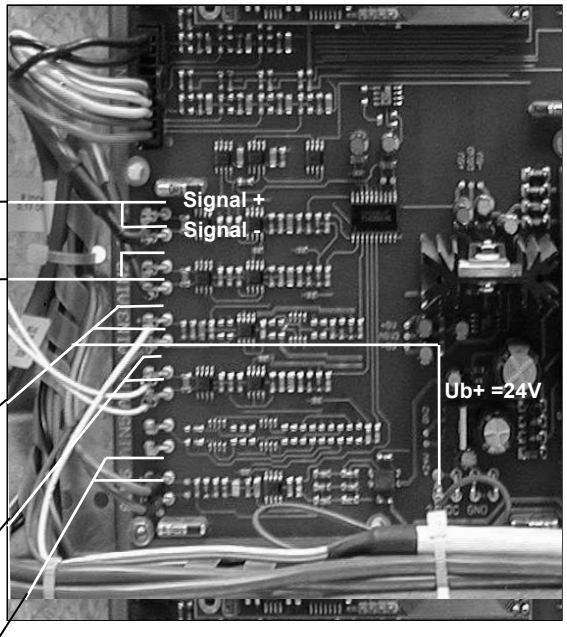
Operating fault / Checks by personnel:

For "Fault 18 Sensor: 6 Input 6" (conductivity sensor is faulty), check first that if demineralized or distilled water is supplied from a container that this has not accidentally been filled with something else.

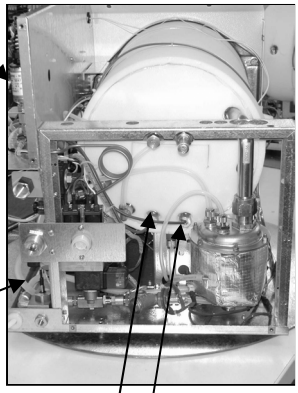
Appliance fault/ Repair by technical service personnel

Overview of sensors / analog inputs

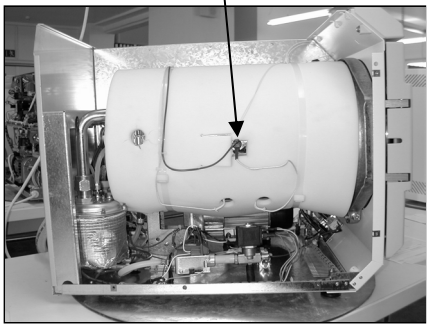
Sensor No.	Input No.	Sensor-characteristic	Sensor designation/ -function
1	AIN1	PT 1000 Class A	"Temp_chambr_elec“ Temperature sensor "Steam" for program control
2	AIN2	PT 1000 Class A	"Temp_Chambr_Dis1/2“ Temperature sensor "Steam" for display/record and monitoring
3	AIN3	Pressure sensor 0 - 10V at 0 - 4000mbar	"Pressure chamber“ Pressure sensor for program control Display, record and monitoring
4	AIN4	PT 1000 Class A	"Temp_preht_chamb“ Temperature sensor for control of chamber temperature
6	AIN6	Water conductivity sensor	"Conductivity“ display/ monitoring elec. conductivity



Pressure sensor AIN 3



Temperature sensor preheating, AIN4



Conductivity sensor, AIN6

Temperature sensors Steam AIN1/AIN2

Display message	Triggered by/Cause	Correction	Comments / Remarks
Fault18 Sensor: 1 Input 1	Temperature at analog input AIN1 ≤ 0°C or ≥ T23 • Temperature sensor faulty Short-circuit/Open • Signal processing on CPU-board faulty	• Exchange temperature sensor • Exchange CPU-board	Until the sensor/CPU-board can be exchanged, in the MELAG Service-program set FLAG F28 to 1, AIN 2 then takes over the function of AIN 1
Fault18 Sensor: 2 Input 2	Temperature measured at analog input AIN2 ≤ 0°C or ≥ T23 • Temperature sensor faulty Short-circuit/Open • Signal processing on CPU-board faulty	• Exchange temperature sensor • Exchange CPU-board	Until the exchange of the sensor/CPU-board, unplug the defective sensor on input AIN2, move the sensor on AIN1 to AIN2 and in the MELAG-Service-Program set F28 to 1
Fault18 Sensor: 3 Input 3	Pressure measured to analog input AIN3 ≤ 0 mbar or ≥ P19 • Pressure sensor faulty • Signal processing to CPU-board faulty • + 24V (voltage to pressure sensor) at CPU-board faulty	• Exchange pressure sensor • Exchange CPU-board	Sequence of testing: +24V supply (between GND and +UB) measured at pressure sensor Signal voltage at pressure sensor between GND and + Signal must be around 2.5V (corresponds 1000mbar air pressure)
Fault18 Sensor: 4 Input 4	Temperature measured at analog input AIN4 ≤ 0°C or ≥ T23 • Temperature sensor faulty Short-circuit/Open • Signal processing on CPU-board faulty	• Exchange temperature sensor • Exchange CPU-board	Until exchange of the sensor/CPU-board, in the MELAG- Service program set FLAG F5 to 0, this deactivates the entire preheating including malfunction reports - drying quality will be reduced
Fault18 Sensor: 6 Input 6	Conductivity measured at analog input AIN6 ≥ L3	• Check for short-circuits of the conductivity sensor • Exchange CPU-board	Until exchange of the CPU-board, in the MELAG-Service program set FLAG F3 to 0, this deactivates the entire conductivity measurement including malfunction reports - temporarily no automatic checks of water quality ,

FAULT 21 Preheating

Triggered by :
The monitoring time limit Uet11-Uet16 from switching on the preheating until reaching the necessary temperature has been exceeded

Causes/ Remedy

Operating fault/Checks by personnel :

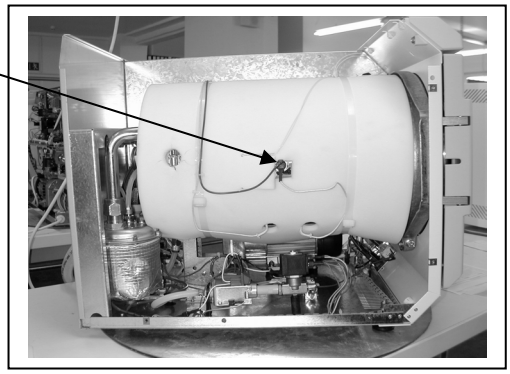
- Mains electricity voltage too low: Check mains supply installations
- Appliance is cold, door not closed properly during preheating

Appliance fault / Repair by technical service personnel

► Control unit Preheating Output ACOUT2 is faulty
⇨ Check in "MELAG Diagnosis-Program":
Switch on output ACOUT 2, (the LED for this output lights up),
Measure voltage at output ACOUT2

► Overheating-protection Preheating faulty
- Control unit permanently open
- Control unit switches too soon, and stops heating power:

⇨ Measure voltage behind the control unit during the program



► Preheating faulty

⇨ In the "MELAG diagnosis program" switch on output ACOUT2, measure voltage directly at the connection to the preheating (voltage but heating remains cold), or check current through heating

⇨ Until a repair is possible, as a temporary measure set the FLAGS F5=0 to deactivate the preheating and the associated malfunction report .

FAULT 22: Overheating of preheating

Triggered by :
The limit value for the preheating-temperature T10 was exceeded

Causes / Remedy

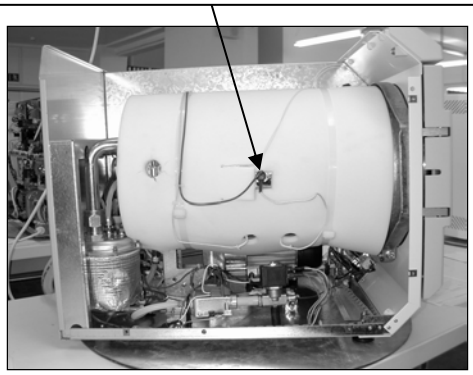
Operating faults / Checks by personnel:

Appliance fault / Repair by technical service personnel

► Control of Pre-heating Output ACOUT2 faulty
⇨ At output ACOUT2 there is a permanent voltage (although LED off), i.e. semiconductor relay faulty, exchange CPU board

► Temperature sensor Pre-heating faulty
⇨ Temp.-sensor Preheating measurements too high/fluctuating, in the "MELAG Diagnosis Program" check the analog input AIN4 during a program by pressing the button " - ".
Exchange temperature sensor

Temp.-sensor "Preheating" AIN4
Under the chamber insulation, stuck directly on the heating



► Signal processing at analog input AIN4 faulty
⇨ Exchange CPU-board

⇨ Until a repair, it is possible to temporarily deactivate the preheating and the malfunction message by setting the FLAG F5=0, and in addition if the output ACOUT2 is defective, disconnect the contacts to the pre-heating from the output.

FAULT 26: A/D-converter

Triggered by:
The maximum permissible deviation for the signal processing in the CPU (A/D-conversion) was exceeded

Causes/ Remedy

Operating faulty/Checks by operating personnel:

Appliance fault / Repair by technical service personnel

► **Hardware signal processing fault**
⇨ Exchange CPU-board

FAULT 27 Temp.Sens.def 1,2

Triggered by :

The maximum permissible deviation D3 (value x 0.1 in °C) between the two temperature sensors " "Temp_chambr_elec" on AIN1 and "Temp_chamber_Dis1/2“ on AIN2 was exceeded.

Causes/ Remedy

Operating fault / Check by the personnel:

Appliance fault / Repair by technical service personnel

► Temperature sensor AIN 1 or AIN 2/ Signal processing on AIN1 or AIN2 faulty

⇨ **Clarification with the help of the print-out record**

If at the time of the malfunction the temperature and pressure values of the print-out correspond to values for saturated steam, then it can be assumed that the temperature measurement at AIN2 is accurate. The cause of the malfunction is therefore probably a faulty temperature measurement at Analog input AIN 1:

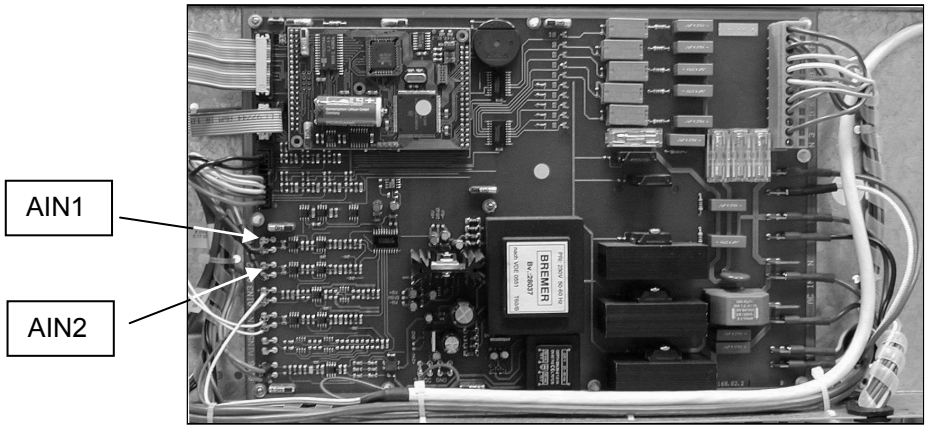
- Temperature sensor "Temp_chambr_elec“ at AIN1 faulty
- Fault in signal processing at AIN1 (AD-converter on CPU board).

⇨ Exchange temperature sensors on AIN1 and AIN2 and restart the program,
If the temperature and pressure values on the print-out at the time of the malfunction correspond to the values for saturated steam then it can be assumed that the temperature sensor from AIN 1 (now in Analog input AIN2) is measuring properly, so that the malfunction is due to the faulty signal processing on the AIN 1: exchange CPU-board.
If there is a deviation from the values for saturated steam, then the fault lies in the temperature sensor originally in AIN1 (now in AIN2): exchange this sensor.

However, if the print-out shows a deviation from the values of pressure and temperature for saturated steam, then the fault lies with the temperature measurements from the analog input AIN2:

- Temperature sensor " Temp_chambr_elec“ at AIN2 faulty
- Faulty signal processing at AIN2 (AD-converter on the CPU-board)

⇨ Exchange temperature sensor on AIN2 with AIN1 and start the program,
If the temperature and pressure values now correspond to the values for saturated steam, then the temperature sensor originally at AIN2 (now in AIN 1) is faulty: exchange the relevant sensor
If there is still a deviation of temperature and pressure values in the print-out from the values for saturated steam, then it can be assumed that sensor originally at AIN 2 (now in Analog Input AIN 1) did not give an incorrect temperature measurement, so that the fault lies in the incorrect signal processing at AIN 2: Exchange CPU-board.



FAULT 29: Battery RAM

Triggered by :

In the data memory of the CPU there is a data inconsistency or a loss of data, This can be due to an electrical disturbance (e.g. very high power supply disturbances), a low battery voltage or a hardware defect in the RAM. On quitting the fault the clock time is automatically set at 00:00 and the load counter is reset to the value from the EEPROM. At the same time all record data in the memory is deleted.

Causes / Remedy

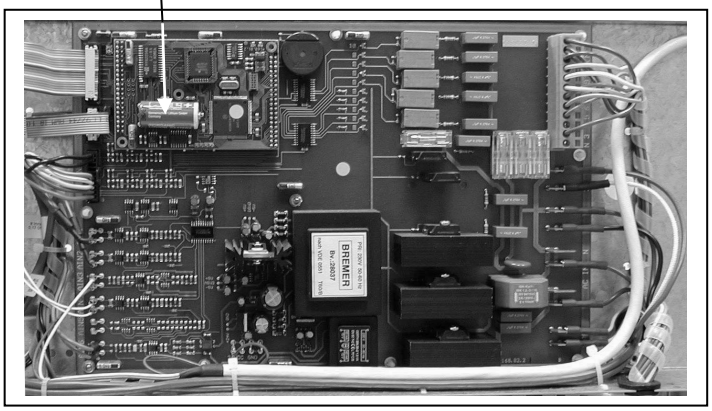
Operating fault / Checks by personnel:

- After quitting the malfunction report : Enter correct time and date settings and restart a program.

Appliance fault / Repair by technical service personnel

► Battery voltage too low

⇨ • If fault occurs regularly exchange battery on CPU- board (battery connections soldered)



► Fault in RAM

⇨ • If after exchanging the battery there is still a malfunction report, then there is a permanent fault in the RAM - replace the CPU board

FAULT 32: Power loss / Sterilize sterile filter

Triggered by :

After the start of a program there is a loss of the power supply. The fault is reported as soon as the electric power supply is resumed:
If there has been a power loss then on restarting, there will be a reminder on the display to sterilize the sterile filter, since this may have been damp and be contaminated with pathogens:

⇨ Remove sterile filter on the rear side of the autoclave
Sterilize the filter in the quick program
After completion of the program replace the sterilized filter

Causes/ Remedy

Operating fault/Check by personnel:

- Manual program termination by switching off the autoclave from the mains supply
- Check for mains power cut, and intact electrical supply installations

Appliance fault / Repair by technical service personnel

- Power switch faulty
- Main fuses F1, F2 (on front of autoclave beneath power switch) is faulty
- Check internal wiring of the autoclave (in particular power supply to the CPU board)
- Power supply on the CPU board is faulty

FAULT 38: Sterilisation TD

Triggered by:

The maximum permissible difference D6 between the temperature value to generate saturated steam calculated on the basis of the measured pressure and the value measured by the temperature sensor "Temp_chambr_elec“ at AIN1 during the period T1-T5 was exceeded.

Cause / Remedy

Operating fault / Checks by personnel:

Overheating, in particular in the case of textile loads soiled with chemicals

Appliance fault / Repair by technical service

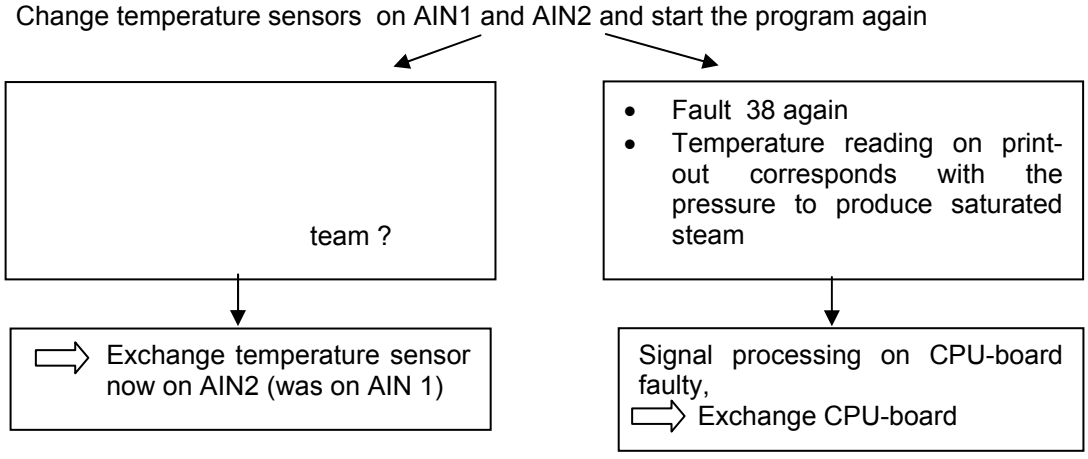
► No saturated steam pressure / Leaking

As a result of too much residual air in the autoclave chamber, the temperature is not high enough to allow the generation of saturated steam.
Check using the print-out records:
Control pressure in record corresponds to control pressures P 6 – P10
Reading in record from temperature sensor "Temp_Chambr_Dis1/2" at Analog input AIN2 is also too low (corresponds to the temperature of temperature sensor "Temp_chambr_elec" at analog input AIN1 (see last line of record print-out.)

⇨ Carry out a vacuum test

► Temperature sensor "Temp_Chambr_elec"/ Analog input AIN1 fehlerhaft

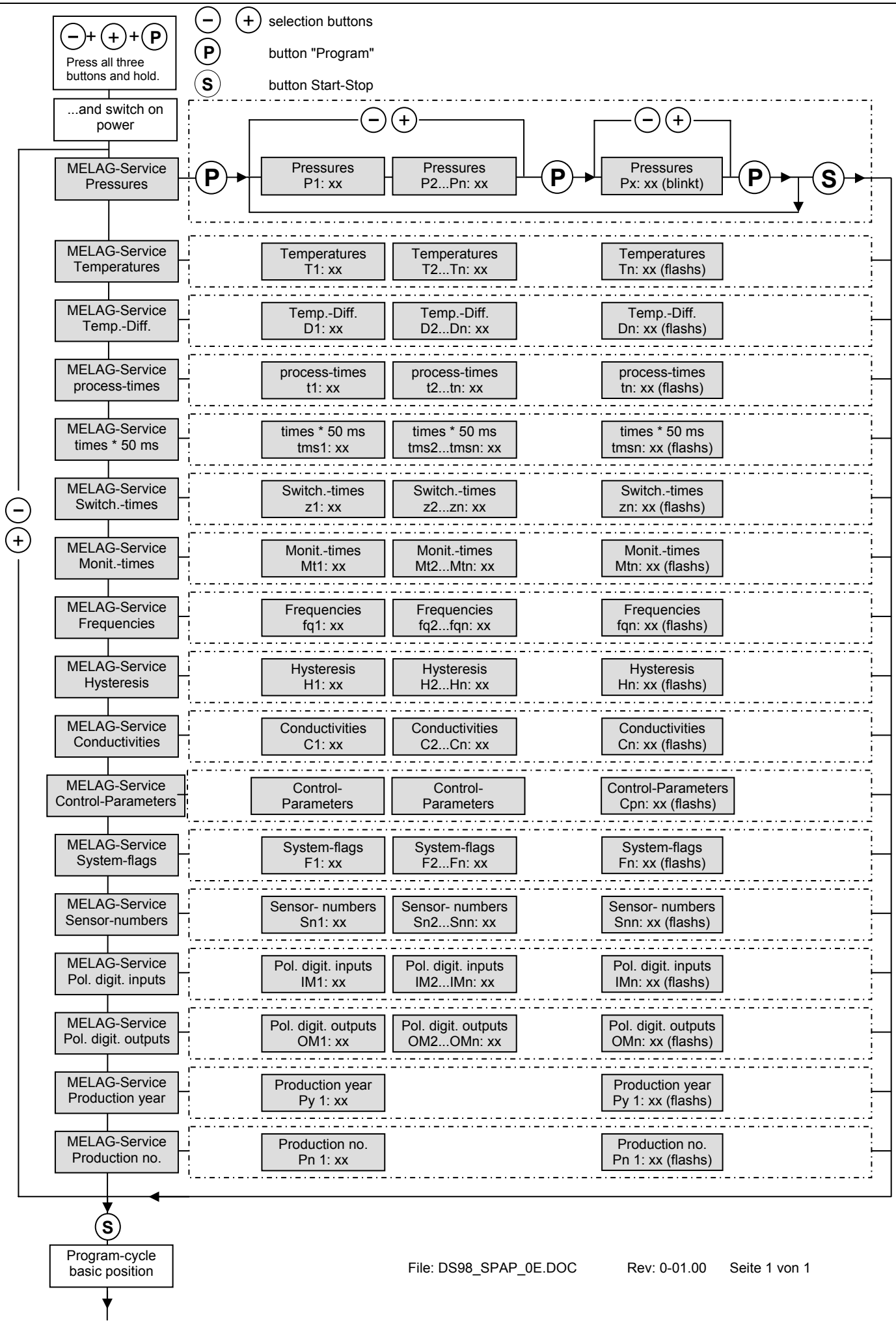
⇨ Check using the record print-out:
Print-out reading for control pressure corresponds to control pressures P 6 – P10
Print-out reading for temperature sensor "Temp_Chambr_Dis1/2“ at analog input corresponds with the pressure required for saturated steam.
In order to determine whether the fault lies in the temperature sensor or the signal processing on the CPU-board, proceed as follows:


Change temperature sensors on AIN1 and AIN2 and start the program again
team ?
⇨ Exchange temperature sensor now on AIN2 (was on AIN 1)
• Fault 38 again
• Temperature reading on print-out corresponds with the pressure to produce saturated steam
Signal processing on CPU-board faulty,
⇨ Exchange CPU-board

► Pressure sensor / Analog input AIN 3 measures incorrectly

If the checks show there is no leak (Vacuum test), check through the following on the program print-out::
⇨ Pressure reading on print-out corresponds to the control pressures P 6 – P10
Print-out readings from temperature sensor "Temp_Chambr_elec“ (AIN1) and from temperature sensor "Temp_Chambr_Dis1/2“ (AIN2) correspond to one another, but both are too low or too high to produce saturated stream

- Exchange pressure sensor
- If there is still a fault, exchange the CPU board


− + selection buttons
P button "Program"
S button Start-Stop
− + P
Press all three buttons and hold.
...and switch on power
MELAG-Service Pressures
Pressures P1: xx
Pressures P2...Pn: xx
Pressures Px: xx (blinkt)
MELAG-Service Temperatures
Temperatures T1: xx
Temperatures T2...Tn: xx
Temperatures Tn: xx (flashs)
MELAG-Service Temp.-Diff.
Temp.-Diff. D1: xx
Temp.-Diff. D2...Dn: xx
Temp.-Diff. Dn: xx (flashs)
MELAG-Service process-times
process-times t1: xx
process-times t2...tn: xx
process-times tn: xx (flashs)
MELAG-Service times * 50 ms
times * 50 ms tms1: xx
times * 50 ms tms2...tmsn: xx
times * 50 ms tmsn: xx (flashs)
MELAG-Service Switch.-times
Switch.-times z1: xx
Switch.-times z2...zn: xx
Switch.-times zn: xx (flashs)
MELAG-Service Monit.-times
Monit.-times Mt1: xx
Monit.-times Mt2...Mtn: xx
Monit.-times Mtn: xx (flashs)
MELAG-Service Frequencies
Frequencies fq1: xx
Frequencies fq2...fqn: xx
Frequencies fqn: xx (flashs)
MELAG-Service Hysteresis
Hysteresis H1: xx
Hysteresis H2...Hn: xx
Hysteresis Hn: xx (flashs)
MELAG-Service Conductivities
Conductivities C1: xx
Conductivities C2...Cn: xx
Conductivities Cn: xx (flashs)
MELAG-Service Control-Parameters
Control-Parameters
Control-Parameters
Control-Parameters Cpn: xx (flashs)
MELAG-Service System-flags
System-flags F1: xx
System-flags F2...Fn: xx
System-flags Fn: xx (flashs)
MELAG-Service Sensor-numbers
Sensor- numbers Sn1: xx
Sensor- numbers Sn2...Snn: xx
Sensor- numbers Snn: xx (flashs)
MELAG-Service Pol. digit. inputs
Pol. digit. inputs IM1: xx
Pol. digit. inputs IM2...IMn: xx
Pol. digit. inputs IMn: xx (flashs)
MELAG-Service Pol. digit. outputs
Pol. digit. outputs OM1: xx
Pol. digit. outputs OM2...OMn: xx
Pol. digit. outputs OMn: xx (flashs)
MELAG-Service Production year
Production year Py 1: xx
Production year Py 1: xx (flashs)
MELAG-Service Production no.
Production no. Pn 1: xx
Production no. Pn 1: xx (flashs)
Program-cycle basic position